

ENERGY TRANSFER IN THE ATMOSPHERE

Many planets have **ATMOSPHERES**, layers of gases that extend above a planet's surface.

Earth's atmosphere is made up of five layers. From lowest to highest, they are:

- **Troposphere**
- **Stratosphere**
- **Mesosphere**
- **Thermosphere**
- **Exosphere**

These layers differ in chemical composition, average temperature, and density. The atmosphere is constantly changing, due to many factors, including the Sun's rotation and the effects of day and night.

SOLAR RADIATION transfers heat to Earth. The amount of solar radiation that reaches a certain area is called **INSOLATION**.

Higher latitudes receive less insolation due to a greater **ANGLE OF INCIDENCE**. The angle of incidence is the angle that occurs between a ray reaching a surface and a line perpendicular to that surface. It increases with latitude.

Very little solar radiation heats the atmosphere directly. Solar radiation arrives in short wavelengths, some of which pass through the atmosphere to Earth's surface, where they are absorbed. Earth's surface reradiates some of this energy as longer, infrared waves. The atmosphere absorbs this infrared radiation and convection transfers the thermal energy throughout the atmosphere.

Earth has a **RADIATION BUDGET** that keeps incoming and outgoing energy in balance. Incoming short-wave solar radiation is reflected and absorbed to various degrees.